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(54) Title: **METHODS FOR DRUG SCREENING**

(57) Abstract

Methods and compositions for estimating the physiological specificity of a candidate drug involve: (a) detecting reporter gene product signals from each of a plurality of different, separately isolated cells of a target organism, wherein each cell contains a recombinant construct comprising a reporter gene operatively linked to a different endogenous transcriptional regulatory element of the target organism such that the transcriptional regulatory element regulates the expression of the reporter gene, and the sum of the cells comprises an ensemble of the transcriptional regulatory elements of the organism sufficient to model the transcriptional responsiveness of said organism to a drug; (b) contacting each cell with a candidate drug; (c) detecting reporter gene product signals from each cell; (d) comparing reporter gene product signals from each cell before and after contacting the cell with the candidate drug to obtain a drug response profile which provides an estimate of the physiological specificity of the candidate drug.